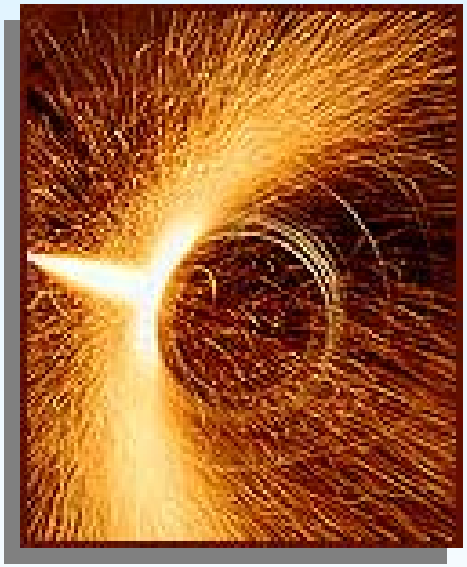
Proposed Airborne Toxic Control Measure to Reduce Hexavalent Chromium and Nickel Emissions from Thermal Spraying



Board Hearing
Sacramento CA
December 9, 2004

California Environmental Protection Agency

Air Resources Board

Today's Presentation

- Background
- Reasons for proposed ATCM
- ATCM Development
- ATCM Requirements
- Benefits & Impacts
- Proposed Modifications
- Summary & Recommendation

Background

Background

ARB's Air Toxics Program

- Identification of Toxic Air Contaminants
  - AB 1807 requires TAC identification
  - Hexavalent Chromium - 1986
  - Nickel - 1991
- Risk Management
  - Airborne Toxic Control Measures (ATCMs)
  - 12 ATCMs adopted
  - 3 ATCMs for Hexavalent Chromium
  - Other control measures

Background

What is thermal spraying?

Materials are heated and sprayed onto a surface to form a coating.

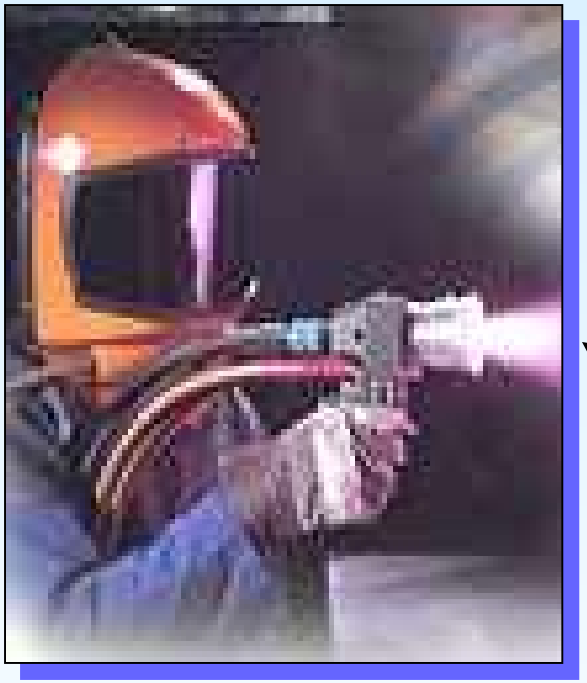
Includes:

- Flame Spraying
- Plasma Spraying
- Twin-Wire Electric Arc
- HVOF
- Detonation Gun

Background

Feed Material

Oxygen & Fuel Gas or Electric Arc



Molten Metal

Background

- Materials are powders, wires, or rods
- May contain chromium, nickel, and other toxic air contaminants
- Generates air emissions of hexavalent chromium & nickel

Background

- **Used in a wide variety of industries:**
  - Aerospace
  - Printing
  - Electronics
  - Oil Refineries
  - Power Plants
  - Computers
- **Applications:**
  - Wear resistance
  - Corrosion protection
  - Thermal barrier
  - Electromagnetic shielding
  - Build up damaged surfaces

Background

Portable Thermal Spraying

- **Conducted at power plants, refineries, etc.**
- **Limited data available**
- **NOT included in proposed ATCM**
  - Will be investigated

Background

Most Thermal Sprayers Have Booths & Control Devices:

- HEPA Filter
- Dry Filter Cartridge
- Baghouse
- Wet Scrubber
- Water Curtain

Background

Current Requirements

- Air Permits
- Toxics New Source Review
- AB 2588 Air Toxics Hot Spots

Reasons for Proposed ATCM

Reasons for Proposed ATCM

- Board request
- Potential use as replacement for hard chromium electroplating
- Hexavalent chromium is very toxic
- Nickel can cause cancer & other health effects
- Community Health/Environmental Justice
- No existing thermal spraying regulations


ATCM
Development

ATCM Development

Key Survey Findings

Total Active Operations =	**51**	
Use Products w/Cr or Ni	37	73 %
Permitted	28	55 %
Unpermitted	23	45 %
Conduct Spraying in a Booth	46	90 %
Have Existing Control Devices	45	88 %
Have HEPA Filters	20	39 %

ATCM Development

Emission Estimates

- Worked with districts to develop emission estimation methodology
- Based on stack tests, scientific research, and industry data

	Actual Emissions (lbs/yr)
Hexavalent Chromium	9.4
Nickel	105

ATCM Development

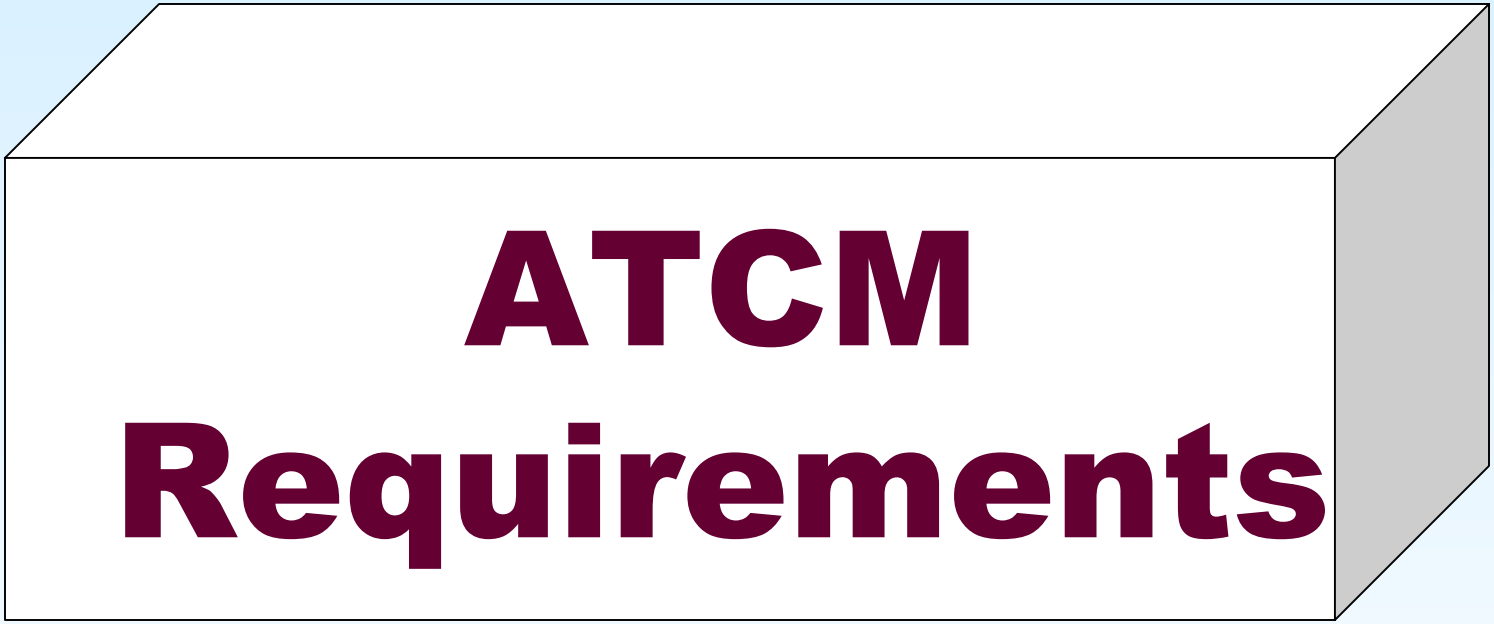
District Breakdown

	Use Cr/Ni	Emissions (lbs/yr)	
		Cr^{+6}	Ni
Bay Area AQMD	6	1.5	22.2
Feather River AQMD	1	0.04	0.3
South Coast AQMD	18	7.6	70.1
San Diego APCD	7	0.3	6.4
San Joaquin APCD	3	0	6.0
Ventura APCD	2	0	0.01
Totals =	**37**	**9.4**	**105**

ATCM Development

Risk Estimates

	Cancer Risk (chances per million)
Cr^{+6}	<1 to 300
Ni	<1 to 30


ATCM
Requirements

ATCM Requirements

Types of Operations:

- **Existing - In operation prior to Jan. 1, 2005**
- **New/Modified - Initial Startup/Modification on or after Jan. 1, 2005**

Compliance Dates:

- **Existing - Jan. 1, 2006**
- **New/Modified - Upon Initial Startup**

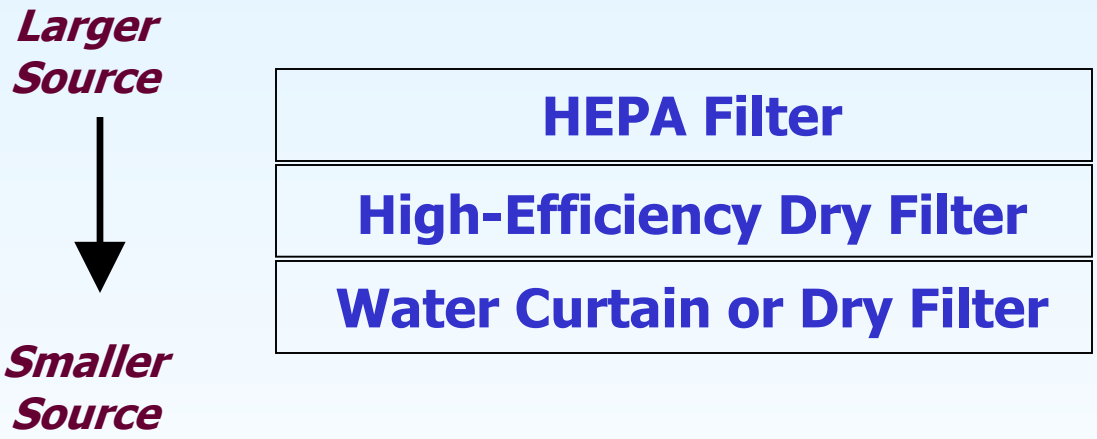
ATCM Requirements

- **Existing Operations -**
  Best Available Control Technology
- **New & Modified Operations -**
  Maximum Control Efficiency
  (e.g., HEPA Filter)
- **All Operations -**
  Emission Inventory
  Permitting & Recordkeeping

ATCM Requirements

Existing Operations

- Based on emissions
- Control efficiency: 90% - 99.97%



ATCM Requirements

Existing Operations - Remotely Located

- Allows 90% control efficiency for remotely located thermal spraying operations.
- A site-specific analysis must be conducted by district to ensure public health protection

ATCM Requirements

Modified Operations

- Modification on or after January 1, 2005
- Must meet maximum control efficiency (e.g., HEPA Filter)

ATCM Requirements

NEW Operations

New operations emitting hexavalent chromium or nickel must meet all of the following criteria:

- Must meet maximum control efficiency (e.g., HEPA filter)
- Must be located outside of and at least 500 feet from the boundary of an area zoned residential or mixed-use
- A site-specific analysis conducted by district ensures public health protection

Benefits & Impacts

Benefits & Impacts

Emission Reductions

- Overall control efficiency after ATCM will be 98%
- Will reduce current Cr^{+6} emissions by 80% *
- Will reduce current Ni emissions by 51% *

**** Most operations are already controlled.***

Benefits & Impacts

Risk Reductions

- Residual Cancer Risk will be <1 to 2 potential cancer cases per million

Benefits & Impacts

Economic Impacts

- Total Capital Cost = $670,000
- Total Operating Cost = $55,000/year
- Total Annual Cost = $150,000/year

Proposed Modifications

- Clarify Two Definitions
- Clarify New Source Requirements
- Clarify Monitoring Requirements

Summary & Recommendation

Summary

- The proposed ATCM is BACT
- The proposed ATCM is consistent with ARB's environmental justice goals
- Reduces hexavalent chromium and nickel emissions and public exposure

Recommendation

- Adopt the proposed ATCM
- Direct staff to investigate portable thermal spraying operations

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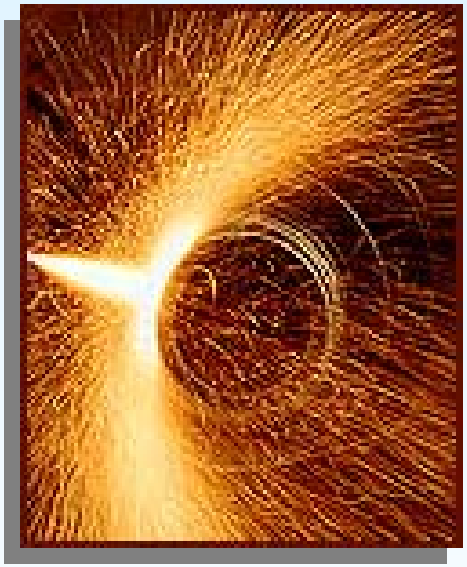

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